

Bioeconomy: An engine for integral development of Colombia

Guy Henry, Elizabeth Hodson, Rafael Aramendis, Eduardo Trigo and Sara Rankin



INTRODUCTION

After the Green Revolution, Latin American countries opted for development models that helped boost economic growth based on natural resources and import substitution. However, this scheme proved to be weak due to the little diversification and value addition from industry, and to the belief that natural resources are limited and crucial for their sustainability. Many countries found themselves caught up in commodity markets, subject to fluctuations in availability and prices.

It is in response to this situation that the concept of Bioeconomy emerges, as it represents a socioeconomic model that reduces dependence on fossil resources and promotes the production and intensive use of knowledge on resources, processes, and biological principles for the sustainable supply of goods and services in all economic sectors (bioenergy, agriculture and bio-inputs, food, fibers, health products, industrial products and bioplastics). Similarly, bioeconomy recognizes the primary role of scientific and technological knowledge as a key driver to define the relationships among agriculture, biomass and industry. In this approach, biomass-based processes are circular and sustainable: the production of residues and waste is reduced to a minimum; new products and services are generated for multiple sectors, which allow the comprehensive and consistent analysis of the challenges within a region, while creating new sources of equitable economic and social growth, from a territorial point of view.

PRODUCTIVE PATHWAYS IN BIOECONOMY

“Productive pathways” have been identified that may lead to produce more with less and reduce environmental impact, although such processes are, according to authors, still under development.

1. **Leveraging biodiversity resources.** This covers all scenarios where the distinctive feature is valorization (domestication, transformation, links to markets, etc.) of biodiversity (discovery of functional traits related to specific sectors and uses, development of new products through innovative transformation, development of markets for local products, etc.).
2. **Eco-intensification.** This relates to the agricultural practices aimed at improving environmental performance of agricultural activities without sacrificing current levels of production/productivity.
3. **Biotechnology applications** (products, tools, and processes). These include industrial tissue culture, marker assisted selection in crop and animal breeding, genetically modified plants and seeds, molecular diagnosis, improving animal reproduction through molecular techniques, modified enzymes, microorganisms and yeasts, etc. This carries over to the management of natural resources, food, fibers and chemical industries, as well as to the supply of energy.
4. **Ecosystem services.** They include the processes through which the environment produces the resources used by humans, such as air, water, food, and materials. Due to the special nature of the relationship between natural resources and social and economic activities under a bioeconomy approach, an ecosystems perspective is a crucial component of any sustainable bioeconomic strategy.
5. **Value chain efficiency.** This includes activities that (i) reduce post-harvest losses and food waste at any level they may occur and (ii) aim at the development of the links to markets needed for innovative bio-based products.
6. **Efficiency, biorefinery, and bioproducts.** This refers to the bioenergy sector and the processes focusing on the substitution of fossil fuels for industrial consumption. For instance, ethanol, biodiesel, and biogas plants, as well as the different activities associated to green chemistry.

Trigo EJ; Henry G, et al. 2013. Towards bioeconomy development in Latin America and the Caribbean. Bioeconomy Working Paper No. 2013-01. ALCUE-KBBE Project. 12 p. <http://bit.ly/2COGjo2>



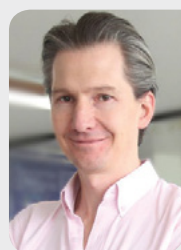
What bioeconomy offers Colombia and the world is an economic model in which the production of goods and services is based on the sustainable use of biological resources – genes, bacteria, biomass (plants), animals, biodiversity, and natural resources, such as soil and water – and the utilization of waste generated during their transformation, production and consumption, thereby contributing to the global goal of decarbonizing the economy

NEW BIO-BASED STRATEGIES, INCREASED SUSTAINABILITY

Bioeconomy is an answer to four emerging and converging global challenges: i) an increasing world population (9 billion people for 2050); ii) an increasing global demand of biomass (at least 60% above current levels), which exacerbates natural resource scarcity; iii) an increasing evidence that the age of oil and low-cost energy is coming to an end; and iv) climate change concerns. All these trends show that keeping up with the same model is not an option and that adapting economic and social patterns is crucial if the United Nations' Sustainable Development Goals (SDGs) are to be met.

What sets this new economic model apart is the incorporation of knowledge in the definition of new productive pathways and alternatives, which moves an unsustainable oil-based economy towards a biomass-based economy, and enables the shift from non-renewable sources to renewable processes and schemes that might be termed "real-time photosynthesis", setting greenhouse gas (GHG) emission and capture at the same geological time, and not separated by millions of years, as in the case of petroleum, which generates a circular process and, thus, increases sustainability. Current knowledge on the biological processes, as well as the capacity to act upon and manipulate them according to specific interests or goals, allows, on the one hand, to propose solutions, and on the other, to generate opportunities (products, processes, services) and thus open relatively unknown, but very promising fields. Therefore, it is no longer about the traditional processes to add value, but about the emergence of completely new value chains or networks that will maximize the impact of 'cascade' technologies to optimize the processes associated to multiple products.

The bio-based strategies change the balance set out in terms of access patterns, resource use, and distribution of profits, among other aspects, to promote a growth in



CONSIDERATIONS ON BIOECONOMY WITH REGARDS TO THE AGRICULTURAL SECTOR*

Juan Lucas Restrepo
Director CORPOICA

Our political and production culture in the agricultural sector remains primarily a short-term culture – an expensive survival formula that puts our agricultural economy at risk in the long term.

But there is still hope. In the last decade, new models have begun to emerge for the Colombian agricultural sector, which apply the principles of bioeconomy. One of the most important models is the significant development of new bioproducts that are being used not only in those models labeled as "organic", but by producers that have incorporated them into conventional production systems, because they consider them a valuable tool to ensure the sustainability of their ventures and to minimize the negative impacts on the environment and on their reputation amongst the rest of society.

We should follow closely the developments associated to the bioeconomy strategies of some developed countries to learn how to harness the same efforts focusing on our own economy, how to develop a competitive supply capacity to generate local biomass, seizing our tropical conditions, where we have comparative advantages to make the most of the developments of third parties.

*The considerations presented in these text boxes synthesize the contributions their authors made at the National Bioeconomy Forum.

productivity and competitiveness of the output produced by the economy of a particular territory. This creates the need for a better understanding at the community level, with clear decision-making

processes to identify and manage advantages and disadvantages emerging from traditional and new activities, at the different implementation levels, and



in the short and long term. A key strategy for this is the reinforcement of training at every level, building entrepreneurial capacities, as well as the communication and decision-making processes.

In addition, it is critical to encourage the articulation of different institutional action under the principles of competitiveness, equity, sustainability, multi-sectoral approach, and decentralization. Thence, the implementation of bioeconomy requires a platform of key players, where the productive sector has a continued dialogue with different ministries and public agencies, scholars, and civil society.

TRANSITION TOWARDS BIOECONOMY

For a particular territory, the successful transition towards bioeconomy will require an intensive effort to develop human resources and better mechanisms for an inclusive participation in society. Bio-based products require not only a solid technological background and a rearrangement of the scientific skills base for research and development (R&D), but also producers and manufacturers capable of managing the new processes (innovation), which are usually much more knowledge-intensive than conventional efforts.

Bioeconomy is a reality in many developed countries, such as Germany, France, Finland, The Netherlands, Russia, and Japan, among others. In the European Union, for example, this model employs over 22 million people in the agri-food, chemical, biotechnological, and energy industry. In Latin America and the Caribbean, there are important developments in Argentina, Brazil, and Costa Rica.

It is clear that every country and every region must set its own bioeconomy development agenda, consistent with its conditions, capacities, and needs, to identify possibilities and opportunities, with the involvement of different sectors of society.



BIOECONOMY IS APPROPRIATE FOR BIODIVERSITY

Brigitte Baptiste
Director
Alexander von Humboldt Institute

It is curious, to say the least, that the country acknowledged globally as the country of biodiversity, does not have an economy that is more consistent with its most characteristic resource: the multiplicity of forms of life found within its territory.

For a system with a prevailing variability of forms of life, this calls for a new understanding of the notion of natural supply, persistence, and the potential uses of such life forms, having an impact on institutions, governance, as well as on the development and adoption of specific mechanisms oriented towards the use of resources. This has prompted many debates with ups and downs in the recent history of Colombia, clouded over by short-term profits from commodities such as mining and oil products. The instability of these global markets has shown the need of other options to ensure a less short-sighted future.

Within the perspective of governance of social-ecological systems, which is the approach IPBES has adopted since 2015 to understand the need to manage the planet's biota in the context of climate change, bioeconomy stands out as a natural alternative to rechanneling ways of life and production systems of local communities, but also to reposition them in the context of urban and regional integration with an innovative perspective. The connection between local and global resources drawing from the utilization of biodiversity, mediated by multiple forms of technology, represents the best option to implement the slogan "think globally, act locally", from the Agenda 21 initiative.

The notion of bioeconomy is crucial to the peacebuilding perspective, as it encourages the recognition of multiple social-ecological experiments overshadowed by the homogenizing spirit of the extractivist models from the past. Indeed, the country should invest a significant share of the royalties obtained from the use of non-renewable resources to ensure a more independent production model, capable of replicating itself as any other organism. This time, Colombia has a golden opportunity if it turns to green.

Although progress has been made adopting processes under the concept of bioeconomy and initiatives with this approach have been suggested, Colombia is undergoing an appropriate time to advance a more thorough discussion on the topic, with the purpose of proposing a new model of economic relations that allows access to a more prosperous and sustainable economy based on innovation. A development model under the concept of bioeconomy allows the utilization of a country's natural wealth, taking into account the specificities of each territory, and facilitates its integration into the global economy with new sustainable products and services, adding value on the basis of scientific and technological knowledge.

The country enjoys an enabling institutional environment for this model. There are several public and private institutions that have undertaken the task of getting to know, assess, conserve, and use the country's biodiversity in a sustainable fashion, with the purpose of contributing to a competitive, sustainable, and socially inclusive development. To do so, sector strategies have been articulated in the 2014–2018 National Development Plan (PND, its Spanish initials), several CONPES [National Economic and Social Policy Councils], and sectoral initiatives that are currently under implementation.

At the 2016 World Economic Forum, Colombia launched its strategy for a new economy based on agro-industry, services, and tourism, as drivers of economic growth. This adds to the Green Growth Mission undertaken by the DNP [the National Planning Department of Colombia] that recognizes that economic development in the country is primarily based on natural resources and proposes sustainable production processes that are socially inclusive and more efficient in the use of resources (Misión de Crecimiento Verde, 2017).

Furthermore, articulated and complementary strategies are being implemented, such is the case of *Estrategia Colombia Siembra* [the “Colombia Sows” Strategy], *Misión*



THE DEVELOPMENT OF PALM BIO-INDUSTRIES WITHIN THE FRAMEWORK OF BIOECONOMY

Jens Mesa Dishington
President of FEDEPALMA

The palm sector has been a key player in the development of the biofuels policy, given the role of palm oil as the main input for the production of biodiesel. An analysis study of the life cycle of palm oil biodiesel in Colombia, commissioned by the Mines and Energy Ministry, found that Colombian palm oil biodiesel has a potential greenhouse gas reduction potential of 83–108%.

The future of this sector may draw upon the generation of bioproducts used as inputs for the chemical industry and for pharmaceutical, nutritional, and biocosmetic products, as well as the creation of new bio-services, such as those associated to cellular medicine and stem cells.

It was found that, within the Colombian exports portfolio, palm oil could comprise even more potential clusters than petroleum. In order to fully address the challenges related to diversification and added-value, there must be a public investment in fields as important as Science and Technology that is consistent with the strategies intended for implementation, to achieve a sustainable economy. While global average spending in R&D as a percentage of GDP is approximately 2.1%, Colombia spent only 0.2%.

para la Transformación del Campo Colombiano [Mission for the Transformation of the Colombian Countryside], and Colombia BIO.

The challenge faced regards the design and implementation of changes in development priorities for the country, redefinition of the approach of public policies, generation of new legal and regulatory instruments, as well as absolute clarity on institutional governance and the role of national and local actors

BIOINITIATIVES IN COLOMBIA

In 2015, a study identified 34 Colombian companies that may be considered as representative of the development of bioeconomic initiatives, concerning the three priority pathways: bioenergy, biotechnology, and biodiversity mainly applied to health¹ (Table 1). These companies are organized under nine sub-sectors: sugarcane for ethanol

production, oil palm for biodiesel production, genetically modified organisms (GMOs), bio-inputs, bioremediation, chemical industry, pharmaceutical industry, biocosmetic industry, and applications in health.

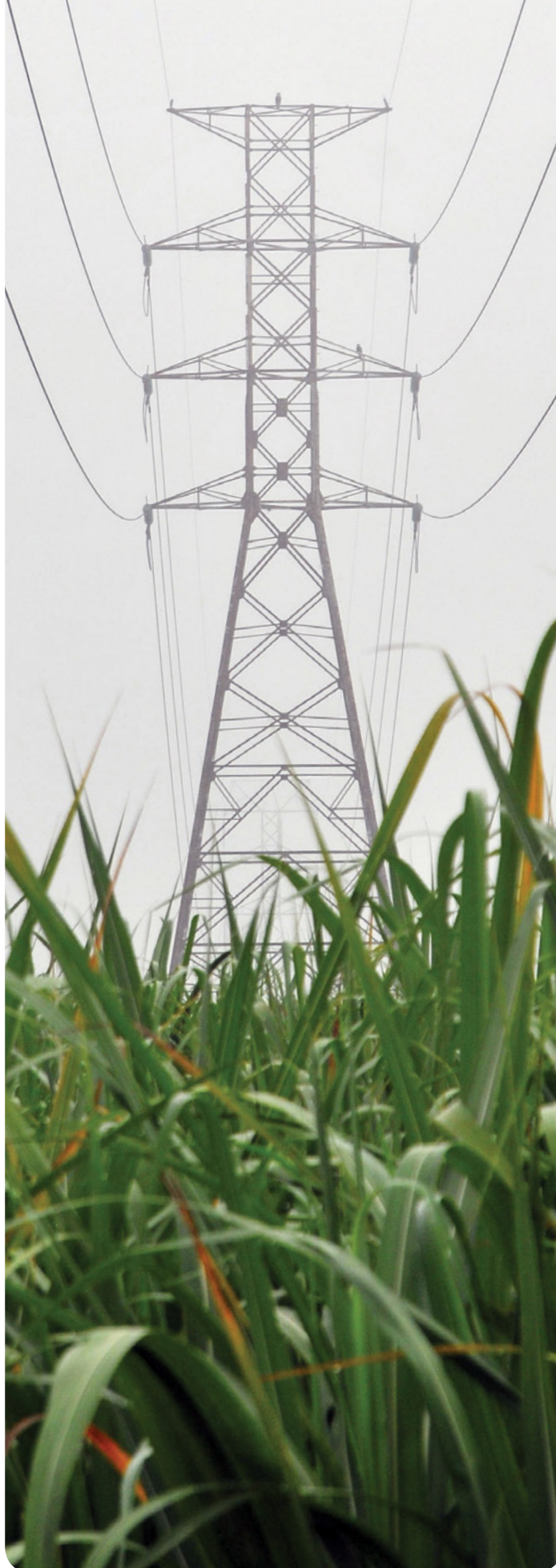
A few examples are listed by pathway:

¹ SURICATA S.A.S. 2017. Bioeconomy. A Case Study Analysis of COLOMBIA [Presentation] Foro Nacional de Bioeconomía: Innovación territorial sostenible. April 27, 2017. Bogotá, Colombia.

Table 1 Examples of Colombian companies with bioeconomy initiatives

SECTOR	SUB-SECTOR	IDENTIFY COMPANY
BIOENERGY	SUGAR CANE SECTOR – BIOETHANOL	<ul style="list-style-type: none"> • Manuelita. Azúcar y Energía • Riopaila • Mayagüez • Providencia • Risaralda • Cauca • Bioenergy
	OIL PALM SECTOR –BIODIESEL	<ul style="list-style-type: none"> • Odin Energy • Oleoflores • Ecodiesel de Colombia • Bio D S.A. • Aceites Manuelita • Biocastilla
BIOTECHNOLOGY AND ECO-INTENSIFICATION	GMOs	<ul style="list-style-type: none"> • Pajonales • Aliar
	BIO-INPUTS	<ul style="list-style-type: none"> • Ecoflora Agro • Biocultivos S.A. • Bioinsumos S.A. • Soluciones Microbiológicas del Trópico
	BIOREMEDIATION	<ul style="list-style-type: none"> • Llano Ambiental S.A. • Solubact • Ecocert
	CHEMICAL INDUSTRY	<ul style="list-style-type: none"> • Smurfit Cartón de Colombia • Disaromas
BIODIVERSITY FOR HEALTH	PHARMACEUTICAL INDUSTRY	<ul style="list-style-type: none"> • Labfarve • Aral Thel • Pronabell S.A.S. • Phitoter • Naturfar
	BIOCOSMETIC INDUSTRY	<ul style="list-style-type: none"> • Apiflower • Ecoflora Care • Neyber • Waliwa
	APPLICATIONS IN HEALTH	<ul style="list-style-type: none"> • Corpogen • Histolab • Vecol

Source: SURICATA S.A.S. (2017).



ECOFLORA

Leading and pioneering company in the development of plant extracts for an effective and sustainable crop protection. This is a global joint venture created in 2011. It combines the innovation capacities developed by EcoFlora since 1988, with Gowan Company's experience of over 50 years in the registry, development, and marketing of solutions for integrated pest and disease management around the world. The company is regarded as a model of innovation in bioeconomy for the development of products from biodiversity, the application of intellectual property strategies, its niche in the marketplace, the use of sustainability criteria to manage their operations and to select their suppliers.

LABFARVE

The Plant Pharmacology Laboratory Foundation, LABFARVE (its Spanish initials) is the first laboratory across the country to conduct research on the use of Colombian medicinal plants and to obtain phytotherapeutic products accepted by the National Institute for Drug and Food Surveillance (INVIMA, its Spanish initials). It is a pioneer in the development of regulations concerning phytotherapeutic medications obtained from natural resources in Colombia. Labfarve has worked hand in hand with academic institutions, entering into research agreements with other scientific organizations and has implemented projects in partnership with different universities. It has also worked hand in hand with indigenous communities, where it offers advice and from which it receives feedback, as well as farming communities, to which it offers support in agro-industrial matters.

MANUELITA S.A.

This is one of the largest sugarmills and one of the first business organizations in the country. For 114 years, Manuelita has remained as one of the soundest companies in Valle del Cauca and in the county, thanks to a clever combination of technology, innovation, and marketing. It is an integral part of the sugar bio-industrial cluster, producing biofuels and has significant linkages upstream and downstream the value chain. Today, Colombia is the second leading country in the production of bioethanol after Brazil, with oxygenated gasoline programs between 8 and 10%, covering 83% of the national market, which will ensure the sector's development with an estimated fivefold growth by 2020.

ALIAR

This is a company engaged in the production, processing, and marketing of high-quality food through a program comprising the whole swine food chain, from soil tillage; maize and soybean crop management; seed plant; storage, drying and concentrate plant; pig production; slaughterhouse; deboning and cold cuts; transport logistics; and marketing. This is one of the largest agricultural companies in the country to use GMOs as an integral part of the value chain, and which comply with environmental, social, and biosafety standards. ALIAR S.A. is one of the agricultural innovation study cases at Harvard University.

The same study shows that Colombia has favorable conditions for the development of bioeconomy, taking into consideration the wide availability of biomass associated with its condition of megadiverse country; a science and technology system in consolidation, mainly in biological sciences, engineering, ICTs; the presence of one of the first experiences in key activities/sectors, such as the pharmaceutical industry, cosmetics, bio-inputs, GMO use, biofuels, and food; and the presence of some business sectors with initiatives/experience in innovation (especially the agricultural sector).

Among the most relevant findings, one that stands out is the fact that a high percentage (80%) of the Colombian bio-companies under study started as family businesses with their own resources or resources from private banks, nearly all of them are innovative in their products or processes, and export to destinations such as Latin America, Europe, and Asia.

These companies operate in strongly-regulated sectors, recognizing the importance of value chains, achieving voluntary certifications, and the implementation of social and environmental responsibility schemes within their operations. However, recognition of intellectual property as a mechanism to protect their innovations, the intensity in university-company relations and their federated representation are still an emerging subject.

TOWARDS A NATIONAL BIOECONOMY STRATEGY

For Colombia, bioeconomy could be a disruptive factor to achieve economic growth, which many governments have set as a State goal. Researchers and experts with different backgrounds, as well as academic, informative, and international cooperation forums² have proposed that the government should prioritize bioeconomy as a development model, since it would be the best formula to use and conserve the country's wide biodiversity, while promoting economic and social well-being in the regions, on the basis that bioeconomy is built upon territories.

2 Foro "El potencial de la Bioeconomía para Colombia", CIAT, Colombia, 2012. Seminario Estrategias locales para el desarrollo de la Bioeconomía, Embajada de España, AECID y CIEMAT, 2016. Foro tendencias Internacionales en Bioeconomía, Cámara de Comercio de Bogotá, 2016. Gran Foro de la Biodiversidad, El Espectador, BIBO y Colombia Bio. 2016. Foro Nacional de Bioeconomía 2017, Bogotá. CIRAD, CIAT, Colciencias. 2017.



Using biodiversity and biotechnological processes and products (mostly non-GMOs) could be one of the most dynamic forms of developing bioeconomy in Colombia, as well as planting genetically modified crops.

In this regard, in the 2000s, public policy documents were identified that, without mentioning the concept of bioeconomy, already involved a main strategy based on the sustainable use of natural resources to diversify the economy. For over two decades, the Colombian Government has used different public policy instruments to promote the development of science and technology, particularly of biotechnology, as one of its cornerstones. Such instruments have been shaped into laws, policy guidelines, such as those issued by the National Economic and Social Policy Council (CONPES), in different sectors and areas of national economy.

In April 2017, Colciencias, in cooperation with the French Agricultural Research Centre for International Development (CIRAD), and the International Center for Tropical Agriculture (CIAT), organized the National Bioeconomy Forum: Sustainable Territorial Innovation, where experts from France, Brazil, Argentina, Chile, Germany, Peru, and Colombia presented the current balance of bioeconomy in Latin America and some of the experiences that stand out in each country. Similarly, and with the purpose of finalizing specific proposals to define action plans for the development of bioeconomy in Colombia, a discussion panel was organized to address public policies that support bioeconomy for the socioeconomic and environmental development of the country, along with three working sessions concerning the three priority pathways for Colombia (Bioenergy and Biorefineries; Biotechnology and Biodiversity for a sustainable production; and Bioprocesses and Bioproducts).



CONSIDERATIONS ON BIOECONOMY APPLIED TO COLOMBIAN AGRICULTURE

Carlos Gustavo Cano

Former Co-director of Banco de la República

According to FAO and OECD, in order to meet the global demand for food in 2050, with a population nearly reaching 10 billion people, production would have to increase by 70% compared to 2009. Only technological innovation aimed at moving towards an 'agro-smart' concept and a better use of soil and water, could overcome food scarcity and would allow us to get the most from the opportunities posed by our agricultural industry to the world.

Approximately 70% of fresh water is used in agriculture, 22% in industry – mainly food and drink – and the rest is for domestic use. In other words, fresh water use is concentrated in the production of food. Meanwhile, water resources are seriously threatened by climatic stress and environmental degradation. The establishment of payments for environmental services targeting sustainable development goals cannot be put off any longer, insofar as they allow us not only to safeguard our 'biocapacity', but also to expand it. We need goals such as the assisted restoration of natural forests; conservation of standing forests; avoided deforestation, reforestation, and new afforestation; regeneration and conservation of biodiversity; conservation of extensive livestock production systems following silvopastoral models; and the massification of drip irrigation.

During these meetings, the situation and the opportunities to develop bioeconomy in the country was analyzed, including the identification of necessary actions to create a national bioeconomy roadmap, taking as a starting point the enabling instruments required. This discussion is summarized in Table 2, sorting actions according to the aforementioned priority pathways.

Table 2 Actions required according to bioeconomy pathways

PATHWAY	REGULATORY ACTIONS	ECONOMIC / TRADING	ENABLING INSTRUMENTS
VALUATION OF BIODIVERSITY	<ul style="list-style-type: none"> • Review of the National Access to Genetic Resources Framework • Streamlining the process through a Single Desk • Improvement of predictability and timeframe of processes • Assessment of new models for a fair and equitable sharing of benefits under the Nagoya Protocol • Defining the regulatory framework for New Breeding Techniques (NBT) 	<ul style="list-style-type: none"> • Sectoral market studies (cosmetics, pharmaceuticals, biological extracts) to identify potential markets for export 	
BIOREFINERY AND BIOENERGY	<ul style="list-style-type: none"> • Compliance with the provisions of laws on mixing volume of ethanol and biodiesel • Issuance of regulations for Euro VI engines • Standards to regulate energy from sources such as lignocellulose, wood fuel, and seaweeds 	<ul style="list-style-type: none"> • Economic and commercial impact assessments over the implementation of free trade agreements on alcohol imports at a zero tariff rate 	<ul style="list-style-type: none"> • Establishment of public-private partnerships • Generation of funds to support the development of new companies • Funding and venture capital • Fiscal and tax incentives
ECOINTENSIFICATION: BIO-INPUTS, ORGANIC AGRICULTURE, PRECISION AGRICULTURE, FUNCTIONAL FOODS	<ul style="list-style-type: none"> • Regulation of precision agriculture • Adaptation or modification of current regulations to include the categories for new functional food 	<ul style="list-style-type: none"> • Comparative cost studies on the use of precision agriculture, satellite images (images obtained through the use of drones for agricultural purposes) 	<ul style="list-style-type: none"> • Implementation of scale-out capabilities
BIOTECHNOLOGICAL PRODUCTS AND PROCESSES	<ul style="list-style-type: none"> • Adjustment of regulations for medical supplies to new materials. Bioplastics, biosensors, biochips, and enzymes 	<ul style="list-style-type: none"> • Analyses of technical and economic feasibility to decide when the new material can replace an obsolete or disused material 	
SUSTAINABLE USE OF BIODIVERSITY RESOURCES AND ECOSYSTEM SERVICES	<ul style="list-style-type: none"> • Adapting and reflecting the new political reality of the peace process in Colombia to redefine new ecotourism zones and areas in the country 	<ul style="list-style-type: none"> • Increasing financial incentive schemes based on the experiences of programs, such as revolving funds and credits • Strengthening and creation of fiscal or tax incentives to civil society reserves • Creation of funds to support product transformation (certification, marketing, standards) • Improving self-sustainability and generation of specific financing mechanisms to avoid excessive dependence on international donors 	<ul style="list-style-type: none"> • Funding and venture capital • Fiscal and tax incentives

The aspects covered in this note highlight how important adopting a bioeconomic perspective may be as a guide to the sustainable development of the country. Colombia has the natural resources and the scientific and technological capacities to move forward in this direction. In fact, it is already implementing it, as it has been clearly pointed out by the cases referred to here, as well as by the nature of discussions held during the National Bioeconomy Forum: Sustainable Territorial Innovation. When speaking about bioeconomy in Colombia, it is not about possibilities, but about realities, in a context where a good share of the main actors in the process are already playing an active part.

Regardless of the foregoing, the developments will not expand and consolidate unless policies are clearly defined and the private sector commits itself to specific investment processes. In this respect, it may be worth to conclude this note emphasizing the particular role bioeconomy could play within the country's current political situation. Colombia has found the path to leave its recent bloodstained past behind, but for this path to be consolidated, it will be necessary to succeed in creating economic activity and rebalancing employment in territorial terms across the country, with the purpose of lifting a wide sector of Colombian society out of poverty. Territorial in its nature, bioeconomy offers a great opportunity for new alternatives to the densification process of regions where resources are found and thus generate the employment required to set the inclusive growth currently demanded. The experiences and ideas proposed in this note show that traveling this path is possible and they offer a basis to build upon the aspects to take into account to get started.

ABOUT THE AUTHORS

Guy Henry

PhD in Agricultural Economics from Texas A&M University. He is a senior researcher at CIRAD, expatriate in Brazil, Argentina, and Colombia. He has coordinated numerous bi-regional projects (EU-LAC) on food systems and bioeconomy. Recently, he has organized different activities to advance bioeconomy in Colombia. He is CIRAD's representative for the Andean region.

Elizabeth Hodson de Jaramillo

PhD from Nottingham University, UK (Botany and Plant Genetic Manipulation), Professor Emeritus of the Pontifical Xavierian University (Bogotá, Colombia), member of the Colombian Academy of Exact, Physical and Natural Sciences (ACCEFYN, its Spanish initials), and member of UNESCO's Commission on the Ethics of Scientific Knowledge and Technology (COMEST).

Rafael Aramendis

MSc in Environmental Management for Sustainable Development, MSc in International Relations, and a degree in Chemistry and Pharmacy from the National University of Colombia. Senior Executive in Life Sciences and Biotechnology with over



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25 years of experience in corporate, governmental, and regulatory matters, as well as sustainability processes in multinational and multi-Latin corporations from the agri-food sector. He is a Managing Partner at the SURICATA S.A.S. consulting firm.

Eduardo Trigo

PhD in Agricultural Economics from Wisconsin University. He was a researcher at ISNAR, former Technical Director of IICA in Costa Rica, founder and director of the ArgenINTA Foundation, and he is Co-director of Grupo CEO SA consulting firm. For many years, he served as Senior Advisor at the Ministry of Science and Technology, and currently he is an advisor at the Ministry of Agro-Industry of Argentina, leading the national bioeconomy platform.

Sara Rankin

Bsc in Communications from the Pontifical Xavierian University and a Master's degree in Project Engineering with Latin America from Toulouse University. She has worked in different rural development and international cooperation projects. Currently, she manages CIRAD/CIAT food systems and bioeconomy projects.



CONTACT

Guy Henry
Bioeconomist

✉ guy.henry@cirad.fr

📍 International Center for
Tropical Agriculture, CIAT
Km 17 Recta Cali-Palmira
C.P. 763537

📍 A.A. 6713 Cali, Colombia

☎ (57) 2 445 0124

🌐 cirad.fr

This document was
prepared within the
framework of the

ALCUE NET
INCO Net project
Grant Agreement
311953, 2012-2017,
co-financed by the



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